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NRO REVIEW COMPLETED

27 November 63

MEMORANDUM FOR THE RECORD

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SUBJECT : [redacted] Meeting - Boston, 20 November

1. Meeting Attendance:

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LMSL [redacted] Itak [redacted]

SAC  
Col. Worthington

NRO Staff

Col. Buzzard

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NPL [redacted] U-K [redacted]

2. Attachment 1 - Proposed Agenda: This agenda provided general guidance but was not followed exactly.

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3. [redacted] of LMSC presented a report on the flight of instrument M-24. (Mission 9060) Because of booster failure, little information was obtained pertinent to the payload. However, the recovery system separation mark monitor indicates separation at 136 seconds. This is approximately the time of the booster malfunctions. The monitor closed later indicating attachment.

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4. [redacted] presented two documents (SP 3-401 and SP-417) which are the results of studies by LMSC and SE on horizon recording and alternate attitude recording techniques. This investigation had been instituted because of problems with the current horizon cameras. These two documents are given in Attachments II and III and will be discussed in detail in subsequent memoranda.

5. Itak presented requested recommendations on a fail-safe shutter for the horizon camera. Itak stated that designs were available and could be added "if desired." The lead time for this

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addition implied that the earliest camera using this would be J-22 (Itek nomenclature). As an alternate to a fail-safe shutter, Itek exhibited another Alfax shutter (Mod. ?) which they feel would do the job. This shutter, while being more rugged, does not have the speed range of the present shutter. The speed of the present shutter is not currently being used and the change would be acceptable. A firm statement of requirements on shutter speeds is needed from NPIC and others.

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6. Discussion then moved to the installation and design of the data block recording of attitude. Col. Worthington states that this is a requirement; however, no documents are available at present. Col. Worthington requested a formal paper from NPIC on attitude recording requirements. The intent of Worthington's action is to install this attitude data recording block (similar to the Lanyard data block) as soon as possible and concurrently remove the horizon camera. The action at Itek was instituted approximately two weeks ago. Col. Worthington further stated that no TD action was required and that the CCB is too cumbersome a tool. Presently a Mod. II horizon sensor is in the vehicle. It was indicated that this Mod. II horizon sensor is not sufficiently accurate for the NPIC requirements. On the basis of the postulated requirement of the attitude recording system, Col. Worthington has reinstated development and procurement of the Mod. II sensor. It is approximately 12 months away. Both [redacted] and I feel that the horizon camera should remain in until an alternate system is flight proven. Col. Worthington is disturbed by the possible failure of the horizon camera shutter resulting in loss of mission material. We have had, to date, one shutter which was intermittently open in flight. This open shutter did badly fog a portion of that mission.

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7. [redacted] (LMS.) presented the status of the test program on J-4. LMSC is approximately 3/4 through Phase I of the proposed test program (which had been received several weeks ago.) J-4, as of the time of the meeting, was pulling film for the rails and was down for checking. The exact nature of the problem had not been determined. The cameras have approximately 35 to 36,000 cycles on them. [redacted] considered that excess operation at high speed may be contributing to this failure. [redacted] do not concur. Col. Murphy pointed out that the low altitude, high speed operation is becoming more and more important. Itek was directed to provide an estimate of life time of components and refurbishment requirements. The LMSC report on J-4 testing is given in Attachment IV. Changes are being made to J-3 based on the findings on J-4; J-3 is now going on to [redacted]. The primary modifications or changes being made are in film tension setting.

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8. Itek presented the program report on TD 2089A (B cassette mod.) This TD required that the clearance on the rollers be opened up. Itek is currently experiencing trouble with cut and wrap with these opened tolerances. [ ] disagrees with the need for the change but is continuing tests. Itek stated that the open tolerances would make significant reduction in the assembly time and difficulty; Itek is in favor of doing this if possible. Because of the lack of agreement on the need for the opening of the tolerances and the high probability of successful operation at current tolerances, it was decided that J-3 would not be held for the conclusions and results of the test, but would be flown with the current tolerances.

9. Many of the current problems on the J system involve alignment of various rollers. [ ] is recommending additional access doors be installed on the barrels. Itek not only seconded this recommendation, but stated that this had been requested at the initiation of the program. There are some mods being instituted on the intermediate roller tolerances. The intermediate roller assembly may be associated with a failure on J-5. [ ] requested tolerances on barrels, etc. LMSC agreed to supply this information.

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10. Status of J-5 was briefly discussed. It should follow J-3 in [ ] SI units and recovery cassettes are not available at present at AP because of failures and reworks. Need time for the units for J-5 is the 27th of November. Status of cassettes and SI units will be discussed later. J-6 is in its earliest check-out phase.

11. Status of Cassettes - The A cassette in J-3 is SP-1. This unit originally came into AP, failed on initial test and the potentiometer assembly was replaced with P-15, assigned to J-21. There were no acceptance tests at Boston. The A cassette in J-6 is operating improperly. There is a satisfactory one in J-4. The schedule of the A cassette is given by Boston based primarily by the potentiometer problem. [ ] and Itek discussed the problem with the vendor. The open circuits experiences are ascribed to oxidation of the winding yielding high resistance point under low usage conditions. The potentiometer was procured for long life operation; however, it is only used for 100 to 500 cycles during its total life. The vendor recommends a material substitution (platinum wire for cupro-nickel alloy) approximately three to four months is required for delivery of the improved item. The present potentiometers will work as long as they are periodically operated to assure clean contacts.

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12. A relatively simple check can be made on the potentiometer when the brush leads are available for test; they cannot be checked with the system. There will be three cassettes available within the next two weeks.

13. In conjunction with the discussion of the potentiometer, Col. Worthington requested that a statement be given on need for the footage potentiometer. LMSC has been asked to review the total of TM requirements and to report at the next meeting.

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14. [ ] of Itek presented the status of the corona marking problem investigation. System J-12 is being used in Boston as a test pad for corona testing and system tests of other modifications. Some details of the status of rollers was given in Attachment V of total status report from Boston. They are now able to get reasonably consistent formulation and have good confidence on the main instrument rollers. Tests of exotic phases have not been made yet. Polyurethane rollers are unsatisfactory. They have been of little success in solving the problem in the SI units. Itek has built a roller tester and film transport system for test of rollers under vacuum conditions. Correlation between tester results and SI units is only fair: A bad test in the roller tester does imply a bad system operation; however, a good test may imply either good performance or moderate corona. J-2 had excess corona on the stellar system, after passing tests. It is noted that the stellar camera was tested with type 4400 film and flown with type 4401 which is much more sensitive. All testing is now being done with type 4401. [ ] of NPIC and [ ] of LMSC are attempting to establish allowable densities of corona fog.

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15. As it was noted that the fiducials are critical and it is sufficient that a change be made in the reticle to reduce sensitivity to hold its changes. Fiducials have been very much over exposed resulting in reduced accuracy. Itek was directed to investigate possible changes. [ ] concluded the discussion of the problem by noting that Wright Field has an investigation underway on proper, workable rubber formulation for rollers.

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16. Stellar index (SI) camera status: Four units are at AP with the late model shutter fully qualified. One unit is used on each M flight; two on each J flight. (TD 20064 is for a cut and splice device to allow use of a single SI for J flight).

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[redacted] indicated that one SI unit should be delivered next week, if satisfactory rollers can be obtained. The question of transfer of LANYARD SI's to the CORONA was raised. The LANYARD SI units are compatible with the M system, with minor modifications. They cannot be used on the J system because of the physical configuration of the camera.

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17. The performance evaluation term (PET) effort is now underway. Material from Missions 9056, 9057, and 1001 are being sent to AFSPPL for RES measurements. [redacted] is going to St. Louis on Friday for detailed planning with ATIC on participation on the effort. AP is now computing the sources of error, on a frame by frame basis, in order to estimate the along-track and cross-track smear-limited resolution. This computation has been completed for the 9057 master camera, the slave camera cannot be reduced as there is no time correlation. NPIC data is on hand for 1001; should be ready soon for 9056. The RES measurements requested from AFSPPL are being modified. The new requirement will be based on an evaluation on the thermal conditions of the flight. The original requirement posed too heavy a load on the AFSPPL facility. The PET will reduce the number of measurements requested per frame and will be measuring on a central section only (central 5th). However, they will request additional micro-analyzer traces. Complete requirements to AFSPPL will be available the latter part of next week. The final PET report is due by the 5th of December. NRO was requested to expedite deliveries of NPIC and AFSPPL reports. (On all future flights, the same computer run, yielding smear-limited performance capabilities, will be made.)

18. The system design by Itek of a cut and splice device could be completed by March of 1964. They are currently continuing feasibility status. The TD 2006A was for feasibility model and engineering model for the SI only. Itek is to present within 30 days a review on the feasibility and some idea of cost and schedules.

19. LMSC presented the M-J schedule status. The instruments for M-25 were shipped to the base early Monday morning, without the SI unit. The SI has been removed after system tests and it is now undergoing a vacuum test for corona using type 4401 film. SI installation is required before pad run and should be back to the base during the meeting. Firm information is not available. M-26 has completed environmental and is scheduled to ship the 27th of the month for a flight postulated on the 14th of December.

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As noted earlier, J-3 is going into environmental testing now. It is expected to be shipped to the base on the 20th of December for a January 9 readiness date. J-5 is following with a shipment on the 2nd of January, and a readiness date of January 24. The LMSC 1963-64 integrated schedule presented at the meeting is Attachment VI. This schedule covers M-25 through 28 and J-3 through J-20 except J-4. The flight dates listed are not official flight dates but are the dates which AP was working with at the time of preparation of the schedule. Attachment VII is status of other subsystems at LMSC and demonstrates some of the problem with cassettes and SI units, both of which are in severe difficulty.

20. Itek presented the standard status report as of 15 November. This is given in Attachment VIII.

21. The night photo experiment previously planned for the LANYARD program was brought up. CCB was asked if they could cancel the effort on the stellar terrain camera as [ ] does not feel that it would give any useful information. As an alternate, it has been proposed to modify the panoramic camera splice or fast film and have it capable for opening up the slit. This would probably effect the reliability of the master camera, and does not seem like a very good approach. The night photograph experiment requires additional government resolution.

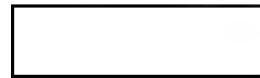
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22. [ ] of EK presented the status of ultra thin' base film. It was essentially a repeat of the status report given at the ARGON meeting. [ ] stated that the SI camera can use the ultra thin base film without modification. The main camera cannot use this material. A major camera modification would be required for use, particularly at the higher cycling speeds. Itek inquired as to the future of this effort. EK requested direction on emulsion to be prepared on ultra thin base when the current process problems are solved. (At this time, [ ] requested that users cease using the SO-102, 130, 132 designations. These designations have been replaced with: 4401 = SO-102; 4400 = SO-130; and 4404 = SO-132.) The primary requirements of the CORONA program are for 4401 film for the stellar camera and 4400 for the index camera. Ultra thin base 4404 for the main camera is not currently in demand, because of the non-usability in this camera. [ ] indicated that the main problem in using the film is a tendency to climb up on flanges and mis-track. This seems to be a camera by camera type function. Some cameras can use ultra thin base and some cannot. The problem is very similar to those encountered in the transition from standard base to thin base some years ago.

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Following the EK presentation TD's were presented. An analysis of the J program and the M program TD's was presented and is given in Attachment IX. A number of new TD's were presented. This time Col. Worthington indicated strong reservations on the usability of the TD route and whether the items under concern were appropriate for TD's. Little discussion was given at this time to the TD's. It was requested that the contracting officer attend TD meetings.

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Chief, Advanced Projects Division  
(Special Activities)

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